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Thornton Creek

Summary of 2015 Surface Water Monitoring Program Results

Washington State Department of Agriculture

Natural Resources Assessment Section

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Introduction

The Washington State Department of Agriculture has monitored pesticide concentrations in surface water throughout Washington since 2003. WSDA takes water samples during the typical pesticide use season (March through September). In 2015, WSDA monitored 14 sites in Washington, and 1 in King County. State and federal agencies use this data to evaluate water quality and make exposure assessments for pesticides registered for use in Washington State.

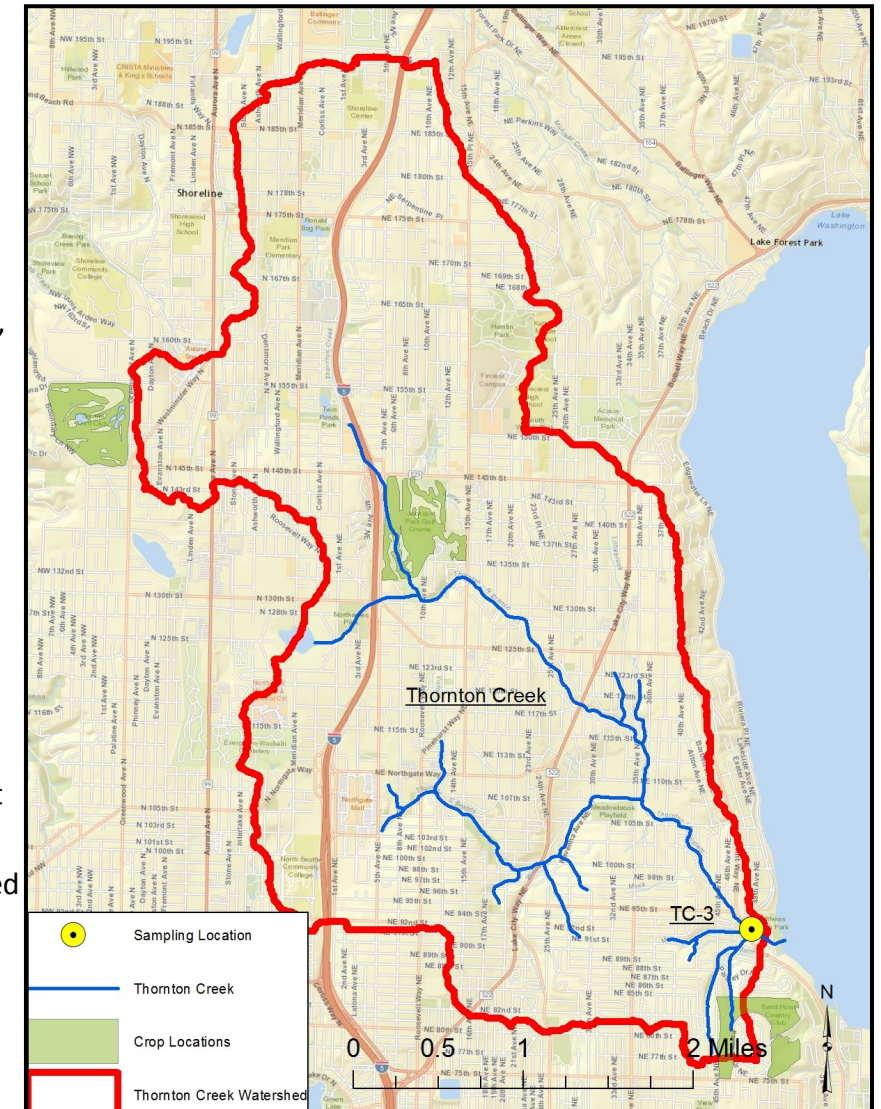
Study Area

WSDA has tested water from Thornton Creek from 2003 through 2015. The watershed drains about 150 acres of golf courses, and land use is primarily mixed residential and urban. The 2015 site was located just upstream from where the creek enters Lake Washington and downstream of a pedestrian footbridge near Matthews Beach Park in King County. Thornton Creek provides spawning habitat for sockeye and fall chinook, rearing habitat for coho, and presence of winter steelhead has been documented*.

* Washington State Department of Fish and Wildlife

Sampling Details

- Samples were collected for 25 weeks, from March 10 through August 25.
- Water samples were tested for 206 chemicals: current and legacy insecticides, herbicides, fungicides, rodenticides, wood preservatives, and pesticide degradates.
- Sample analysis for pesticides and total suspended solids was conducted at Manchester Environmental Laboratory in Port Orchard, WA.
- General water quality parameters; dissolved oxygen, conductivity, pH, water temperature, and streamflow were measured at every sampling event.
- Air and water temperature (measured every 30 minutes) was monitored for the entire sampling season.



This table shows the pesticides detected, with dates and concentrations. They are color coded to identify which assessment criteria were surpassed. The assessment criteria used here are state and federal water quality criteria, reduced by half for safety. This 0.5 safety factor is used to make sure the criteria protect aquatic life and water quality issues are found early. Watersheds with detections above the criteria are prioritized for more monitoring and educational outreach. See <http://agr.wa.gov/PestFert/natresources/SWM> for more information.

Assessment Criteria		Month and Day		Mar				Apr				May				Jun					Jul				Aug				
		Analyte Name †	Use‡	10	17	24	31	7	14	21	28	5	11	19	26	1	9	15	23	29	7	14	21	27	4	10	17	24	
May affect fish survival at sensitive life stages		2,4-D	H		0.055		0.12		0.103			0.089																	
		4,4'-DDE	D-OC		0.013																0.012							0.01	
Additional level of protection for endangered species		AMPA	H	--	--	--	--	--	0.14		0.11	0.094	0.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
		Boscalid	F															0.053				0.17							
May affect invertebrate survival		Chlorsulfuron	H			0.146	0.031	0.063	0.045	0.025	0.021	0.022																	
		Cycloate	H														0.12												
Nearing a pesticide state water quality standard		Dicamba	H		0.022																								
		Dichlobenil	H		0.028	0.023	0.019	0.016	0.031	0.015	0.015	0.018	0.013																
May affect fish growth or reproduction with prolonged exposure		Diuron	H		0.008	0.015	0.129	0.006	0.02	0.006	0.006	0.005				0.006		0.004			0.004	0.008	0.003		0.005		0.017	0.016	
		Fludioxonil	F																			0.9							
May affect invertebrate growth or reproduction with prolonged exposure		Glyphosate	H	--	--	--	--	--	0.32	0.036	0.044	0.21	0.044	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
		Imazapyr	H						0.012	0.012	0.012																		
May affect aquatic plant growth		Imidacloprid	I-N		0.01				0.015																				
		Isoxaben	H		0.003	0.002			0.003																				
May affect aquatic plant growth or reproduction with prolonged exposure		Mecoprop (MCPP)	H		0.054		0.071																						
		Metsulfuron-methyl	H			0.08			0.027																				
Below all identified criteria		DEET	IR			0.04																0.056		0.026			0.007		
		Pentachlorophenol	WP		0.024		0.026																		0.013		0.017		
No published criteria available		Piperonyl butoxide	Sy																			0.041							
		Propiconazole	F				0.006		0.012	0.01																			
Not detected (below detection limit)		Pyraclostrobin	F			0.014																							
		Simazine	H															0.058											
No Data	---	Sulfometuron methyl	H			0.178	0.03	0.022	0.033	0.013	0.011		0.012	0.01			0.01												
		Triclopyr acid	H		0.026											0.11											0.099	0.026	
		Streamflow	N/A	7.1	18.2	19.8	10.6	6.0	11.8	6.2	5.9	5.9	4.3	4.2	3.7	4.8	3.0	2.8	2.6	2.5	2.2	2.4	2.3	3.8	2.2	2.0	3.7	2.4	
		Total suspended solids	N/A	6	7	10	11	4	5	8	4	8	7	4	4	18	4	4	3	3	5	3	3	3	2	5	4	4	
		‡ C: Carbamate, D: Degradate, F: Fungicide, H: Herbicide, I: Insecticide, IR: Insect repellent, L: Legacy pesticide, M: Multiple, N/A: Not applicable, N: Neonicotinoid, OC: Organochlorine, OP: Organophosphate, PY: Pyrethroid, Sy: Synergist, WP: Wood preservative, *Equipment malfunction. †Units are as follows: pesticides, µg/L; streamflow, cfs; and total suspended solids, mg/L.																											

Results Summary

- There were 92 total pesticide detections in Thornton Creek. Most detections occurred early in the growing season in (March, April, and May).
- 4,4’DDE, a degradate of DDT, was detected three times at levels nearing or above a state water quality standard.
- 4,4’DDE detections are a result of historical use and are not a result of current pesticide use patterns
- Sulfometuron methyl was detected once in March at a level which may affect aquatic plant growth and reproduction.
- Common products containing sulfometuron methyl are Sulfomet, Oust, Landmark, Spyder, and Lineage.
- Sulfometuron methyl is a pesticides of interest in Washington State and has been detected in past years in King County.

Recommendations

- Read and follow label directions to protect water quality.
- Eliminate drift and runoff to adjacent surface water.
- Implement best management practices, including conservation buffers, vegetative filter strips, sediment basins, and setbacks from water.
- Review pest control needs and select appropriate and less-toxic pesticides.
- Manage irrigation to prevent runoff, and check the weather forecast before application to prevent runoff due to rainfall.
- Maintain, inspect, and calibrate application equipment.